o'clock. The same phenomenon was observed at Southwick, Mass., by Mr. Holcomb, at a much earlier hour.

Professor Bache read an extract of a letter addressed by Mr. Forshey, of Natchez, to Mr. Espy, in reference to the tornado which occurred there recently.

The writer stated that he had spent much time in examining the track of the storm in the vicinity of Natchez. He had ascertained its extent to have been not less than five or six miles below the city, and twenty miles beyond; its effects having been felt, but with less violence, for nearly one hundred and fifty miles. The track near Natchez was directed sixty degrees to the east of north. After describing the destruction of the city of Natchez, the writer states, that objects were every where blown towards the track of the storm; those directed most westwardly lying invariably below those directed more eastwardly. Mr. Forshey also describes the effect upon the houses as of an explosion outwards. In his view, these facts strongly confirm Mr. Espy's theory of this meteor.

Professor Bache referred to the conformity between the phenomena described by Mr. Forshey, and those which were ascertained by Mr. Espy and himself to have occurred at New Brunswick, N. J., in the tornado of June, 1825.

Stated Meeting, July 17.

Present, thirty-five members.

Mr. Du Ponceau, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

Astronomical Observations made at the Royal Observatory, Greenwich, in the Year 1838, under the Direction of George Biddell Airy, Esq., M. A. Astronomer Royal, &c. &c. 4to. London, 1840.—*From the Royal Society.*

Philosophical Transactions of the Royal Society of London, for the Year 1839. Parts 1 and 2. 4to. London, 1839.—*From the same.*

List of the Members of the Royal Society, 30th November, 1839.—*From the same.*

Zenith Distances observed with the Mural Circle, at the Royal Observatory, Cape of Good Hope, and the Calculation of the Geocentric South Polar Distances. 4to. 1837.—*From the Lords Commissioners of the Admiralty of Great Britain.*

Transactions of the Cambridge Philosophical Society. Vol. VII. Part 1. 4to. Cambridge, 1839.—*From the Society.*

Monthly Notices of the Royal Astronomical Society, containing Abstracts of Papers, and Reports of the Proceedings of the Society, from June, 1833, to June, 1836. Vol. 3. 8vo. London, 1836.—*From the Society.*

Also, Notice No. 6, Vol. V., for April 10, 1840.—*From the same.*

Transactions of the Society instituted at London for the Encouragement of Arts, Manufactures, and Commerce; with the Premiums offered for the Years 1838–39 and 1839–40. Vol. 52. 8vo. London, 1839.—*From the Society.*

Collections of the Georgia Historical Society. Vol. I. 8vo. Savannah, 1840.—*From the Society.*

Bulletins de l'Académie Royale des Sciences et Belles Lettres de Bruxelles. Tom. I.—VII. 8vo. Bruxelles, 1832–39, et Nos. 1 & 2, Janvier et Février, 1840.—*From the Academy.*

Nouveaux Mémoires de l'Académie Royale des Sciences et Belles Lettres de Bruxelles. Tom. X. XI. XII. 4to. Bruxelles, 1837–38–39.—*From the same.*

Annuaire de l'Académie Royale des Sciences et Belles Lettres de Bruxelles. 2e, 3e, 4e, 5e, et 6e Années. 5 Vols. 12mo. Bruxelles, 1836–40.—*From the same.*

Annuaire de l'Observatoire de Bruxelles, pour l'an 1840. Par le Directeur A. Quetelet, Secrétaire Perpétuel de l'Académie Royale de Bruxelles, &c. &c. 12mo. Bruxelles, 1839.—*From the Author.*

Aperçu de l'État de l'Observatoire, pendant l'année 1839. Par le Directeur de cet Établissement. 8vo. Bruxelles, 1840.—*From the same.*

Catalogue des Principales Apparitions d'Étoiles Filantes. Par A. Quetelet, &c. &c. 4to. Bruxelles, 1839.—*From the same.*

Sur la Longitude de l'Observatoire Royal de Bruxelles, Mémoire lu à la Séance du 6 Juillet, 1839. Par A. Quetelet, &c. &c. 4to. Bruxelles, 1839.—*From the same.*

Observations Météorologiques faites à Maestricht, pendant les Années 1805—1812. Par M. le Professeur Minckelers. 4to.—*From the Author.*

On the Heat of Vapour, and on Astronomical Refractions. By John William Lubbock, Esq., Treas. R. S. &c. &c. 8vo. London, 1840.—*From the Author.*

A Comparative Vocabulary of Indian Languages. By Benjamin S. Barton, M. D. (extracted from his New Views) with Manuscript Additions by Peter S. Du Ponceau, and a German Review of Barton's "New Views." 8vo.—*From Mr. Du Ponceau.*

An Enquiry into the Origin of the Population of America, from the Old Continent. By John Severin Vater. Translated from the German, by Peter S. Du Ponceau. (In MS.) Folio.—*From the same.*

A Sketch of the Politics, Relations, and Statistics of the Western World, and of those Characteristics of European Policy which most immediately affect its Interests; intended to demonstrate the Necessity of a Grand American Confederation and Alliance. 8vo. Philadelphia, 1827.—*From the same.*

Hugonis Grotii Annales et Historiæ de Rebus Belgicis. 24mo. Amstelædam. 1658.—*From the same.*

De la Liberté des Mers. Par M. De Rayneval. 2 Vols. 8vo. Paris, 1811.—*From the same.*

On the Freedom of the Sea. By M. de Rayneval. Translated from the French, by Peter S. Du Ponceau. In 3 Vols. (MS.)—*From the same.*

Principles of Political Economy. Part the Third—Of the Causes which retard Increase in the Numbers of Mankind. Part the Fourth—Of the Causes which retard Improvement in the Political Condition of Man. By H. C. Carey, Author of an Essay on the Rate of Wages. 8vo. Philadelphia, 1840.—*From the Author.*

A Treatise on Currency and Banking. By Condy Raguet, LL.D., Member of the American Philosophical Society, &c. 2d edition. 8vo. Philadelphia, 1840.—*From the Author.*

Address delivered before the Philomathean Society of the University of Pennsylvania, Thursday, Nov. 1, A. D. 1838. By William B. Reed. 8vo. Philadelphia, 1838.—*From Prof. Henry Reed.*

The Infancy of the Union. A Discourse delivered before the New York Historical Society, Thursday, Dec. 19, 1839. By Wm. B. Reed. Published at the request of the Society. 8vo. Philadelphia, 1840.—*From the same.*

Proceedings of the Annual Meeting of the Western Rail Road Corporation, held, by adjournment, in the City of Boston, March 12, 1840, including the Report of the Committee of Investigation appointed by the Stockholders. 8vo. Boston, 1840.—*From Mr. Isaac P. Davis.*

Historia de la Revolucion Hispano-Americana. Por D. Mariano Corrente, Autor de la Geografia Universal. 3 Tom. 8vo. Madrid, 1829–30.—*From Mr. A. de Frias.*

Memorias de la Seccion de Historia de la Real Sociedad Patriotica. 8vo. Habana, 1830–31.—*From the same.*

La España Maritima. Serie de Articulos relativos á las Ciencias y Artes, proprias ó Auxiliares de la Marina, &c. &c. 8vo. Cuadern. 1–9. Madrid, 1838–9.—*From the same.*

Folletin Historico ó Coleccion de Historias Españolas. Su Autor, Don Juan Miguel de los Rios. 8vo. Cuadern. 1–3. Madrid, 1837.—*From the same.*

Fourth Report of the Inspectors appointed under the Provisions of the Act 5 and 6 Will. IV. c. 38, to Visit the different Prisons of Great Britain. 1. Home District. Presented to both Houses of Parliament, by Command of her Majesty. Fol. London, 1839.—*From Mr. Samuel R. Wood.*

Jahrbücher der Literatur, Band. 85, 86, 87, 88. 8vo. Wien, 1839.—*From the Editor, Von Hammer-Purgstall.*

Falknerklee, bestehend in drey ungedruckten Werken über die Falknerey, nähmlich. 1. Das Falkenbuch (Türkisch.) auf der Ambrosiana zu Mailand. 2. ΙΕΡΑΚΟΣΟΦΙΟΝ das ist: die Habichtslehre (auf der k. k. Hofbibliothek zu Wien). 3. Kaiser Maximilians Handschrift über die Falknerey (auf der k. k. Hofbibliothek zu Wien) aus dem Türkischen und Griechischen Verdeutscht, und in Text und Übersetzung herausgegeben von Hammer-Purgstall. (In Dreyhundert Abdrücken.) 8vo. Wien, 1840. *From the same.*

Wiener Zeitschrift fur Kunst, Literatur, Theater, und Mode; Donnerstag, den 23 Jänner, 1840. Enthaltend:—"Der Sänften Pallast der Beduinen auf der Insel Raudha." Von Hammer-Purgstall.—*From the same.*

Gemäldesaal der Lebensbechreibungen grosser Moslimischer Herrscher der ersten Sieben Jahrhunderte der Hidschret. Von Hammer-Purgstall. Band V. 8vo. Leipzig und Darmstadt, 1838.—*From the same.*

Catalogo dei Codici Arabi, Persiani e Turchi della Biblioteca Ambrosiana (per Giuseppe de-Hammer). 8vo. Milano, 1839.—*From the same.*

O Auxiliador da Industria Nacional, &c. &c., Periodico Mensal, publicado pela Sociedade auxiliadora da Industria Nacional, estabelecida no Rio de Janeiro. Anno VII. Nos. 7, 8, 9, 10, 11, e 12. (Julho—Dezembro, 1839.) 8vo. Rio de Janeiro, 1839.—*From Mr. J. S. Rebello.*

Naturhistorische Skizze von Lithauen, Volhynien und Podolien in geognostisch—mineralogischer, botanischer, und zoologischer Hinsicht, entworfen von Edward Eichwald, der Medizin Dr. u. Prof. der Kaiserl. Academie der Wissench. zu St. Petersb. u. s. w. 4to. Wilna, 1830.—*From the Author.*

The American Medical Library and Intelligencer. Vol. IV. Nos. 6 and 7, for June 15, and July 1, 1840. By Robley Dunglison, M. D., Sec. A. P. S.—*From the Editor.*

Minutes of the Provincial Council of Pennsylvania, from the Organization to the Termination of the Proprietary Government. Published by the State. Vol. 3, containing the Proceedings of Council from May 31st, 1717, to January 23d, 1735–6. 8vo. Harrisburg, 1840.—*From the State.*

Memoirs of the Historical Society of Pennsylvania. Vol. IV. Part 1. 8vo. Philadelphia, 1840.—*From the Society.*

FOR THE CABINET.

A beautiful and ingeniously contrived Balloting Box, of Mahogany, for the use of the Society.—*From Mr. T. U. Walter.*

The Astronomical Committee, consisting of Dr. R. M. Patterson, Mr. Sears C. Walker, and Prof. A. D. Bache, to whom was referred the communication of Mr. Rümker, of Hamburg, on the three comets discovered by Galle, of Berlin, reported in favour of its publication in the Society's Transactions, which was ordered accordingly.

Dr. Dunglison, as Secretary of the Historical and Literary

Committee, reported the minutes of the Committee in relation to several subjects referred to them. Whereupon, on motion of Mr. Kane, it was resolved, that so much of the proceedings of the Committee as refers to the Paper of Mr. Breck, entitled, "Historical Sketch of the Continental Bills of Credit, from the Year 1775 to 1781, with Specimens thereof," and contains a resolution, that the Paper is worthy of publication in the next volume of the Transactions of the Historical and Literary Committee, is approved by the Society, and the publication thereof ordered accordingly.

Immediately after the battle of Lexington, which took place in April, 1775, the colonial congress began to prepare for war. Having neither funds, nor the means of creating any for present use, either by taxation or loans, they adopted the plan of issuing paper money. Whereupon, even before the battle of Bunker's Hill, one million of dollars were emitted, in bills of various denominations, from one-third, one-half, and two-thirds of a dollar, to eight dollars; and subsequently of denominations varying from thirty to eighty dollars. These bills were made payable to bearer, and entitled him to receive Spanish milled dollars for them, or their value in gold or silver; and for their redemption, congress bound the thirteen Confederated Colonies. Contracts were made at Philadelphia for printing the bills; and thirty individuals of that city were appointed by congress, to divide the labour of signing them, so as to have commonly two names on each bill. Appropriate mottoes, in Latin, were placed on the obverse, and a rudely printed emblem on the reverse. Treasurers were named to administer these funds, at an annual salary of five hundred paper dollars.

The colonies were called upon to tax themselves for the repayment of this money; and the quota of each was determined, according to the number of its inhabitants, including negroes and mulattoes. Virginia ranked first, Massachusetts second, Pennsylvania third; and New York came in with Connecticut and North and South Carolina. When the treasurers happened to have gold or silver, they were directed to advertise their readiness to exchange the same for paper; and some individuals, ardently patriotic, sent large sums of metallic money to the treasury, and received bills of credit in return at par. In the course of the year 1775, ten millions of dollars were emitted.

The next year independence was declared, and some specie having

been imported, the credit of the bills was well sustained; and, in order to avoid interruption in striking them off, the printers were excused from military duty.

The press was now in permanent operation, and the sums emitted so large, that public confidence began to diminish, while ruinous fluctuations in the prices of every commodity took place. Upon this, congress gave new assurance of their intention to redeem every dollar; and availing themselves of the good effect of this promise, they issued this year (1776) in loan office certificates, lottery tickets and bills of credit, about twenty millions. Yet, fearful of a renewed depreciation, they authorized General Washington to take whatever he might want for the use of the army, whenever the inhabitants refused to sell, and to imprison and report the names of all those who rejected the continental currency. These harsh measures did not, however, strengthen the credit of the bills; and congress passed, in the beginning of 1777, vehement resolutions of accusation against the enemies of liberty, for impairing their credit, by raising the nominal value of gold and silver. The states were exhorted to pass laws to compel every one, under the penalty of forfeiture of goods, &c. to take them at specie value; to make them a tender in payment of debts; and the refusal to receive them *an extinguishment of such debts.*

About twenty-one millions had been raised in 1777, on loan and bills, when, on the 3d of December of that year, congress found themselves obliged to acknowledge that the quantity issued was too great.

A pause was resolved upon, and recourse had to France for a loan of two millions sterling. Meantime, the British at New York, and others elsewhere, counterfeited extensively; provisions and merchandise increased manifoldly in price, and the current money fell to four for one. Much of this unsteadiness was ascribed by congress "to a spirit of sharping and extortion."

In the year 1778, the press was again in full operation, and sixty-three millions were issued, at three and four for one; for, abused as this prolific source had been, and continued to be, it seemed to offer greater advantages than any other of the various means that congress had tried. Very little hard money circulated; for, while this large sum in paper was paid out in the single year of 1778, only seventy-eight thousand dollars in specie passed through the treasury.

Taxes were recommended as a sinking fund; but the credit of the

bills had fallen too low to be forced upon the public at the scale fixed by congress; it was, therefore, ordered by that body, on the 8th of October, 1778, "That all limitation of prices of silver and gold be taken off."

The appeal by congress, on asking for taxes, is clothed in stirring language. They think the redemption of the bills no difficult matter; and, upon this conviction, send forth fifty millions, giving this time an assurance to pay the whole, on or before the 1st of January, 1797.

During the following year, 1779, sixty-three millions were emitted; and now the amount abroad having reached the enormous sum of one hundred and sixty millions, congress resolved to stop the press, whenever the increase should extend to two hundred millions. This sum, with others due elsewhere, would swell the grand total at the end of the war, they supposed, to three hundred millions. Stupendous, says Mr. Breck, as this debt was for a community in its infancy, they thought the resources of the country equal to the payment of the whole. "There are at present," they say, "three millions of inhabitants in the thirteen states; and this sum divided, per head, would give but one hundred dollars for each to pay, in eighteen or twenty years; and if the debt be assessed in proportion to the wealth of the inhabitants, the poor man's share would not be more than ten dollars; and if twenty years be taken to pay the debt, our population will be nearly double, and our ability to pay increased more than two-fold." Again, they say: "This paper money has been eminently serviceable, and cannot 'make unto itself wings and fly away.' It remains with us; it will not forsake us; it is always ready for purposes of commerce or taxes; and every industrious man can find it. Having pledged our lives, fortunes and sacred honour for our independence, the same pledge is given for the redemption of these bills." "A bankrupt, faithless republic," adds this congressional address, "would be a novelty in the political world, and appear like a common prostitute among chaste and respectable matrons. It is impossible that America should think, without horror, of such an execrable deed."

The hopes of that patriotic body were not realized. These bills, which have never been paid, defrayed the chief expense of five years of active warfare, in which specie bore so small a share, that the official accounts of the years 1778 and 1779 show only one hundred and fifty-six thousand dollars, paid out of the treasury in hard money during those two years, against ONE HUNDRED AND THIRTY

MILLIONS in paper. This paper was suffered to depreciate to one thousand dollars for one in silver, and there it died without redemption—the vast sum of two hundred millions being extinguished by a gradual depreciation.

It was further resolved, that such part of the proceedings of the Historical Committee as refers to a MS. communication, entitled "A Grammar of the Mohawk Dialect of the Iroquois Language, or of the Five Ancient Confederated Nations; containing Rules and Exercises intended to Exemplify the Indian Syntax, according to the best Authorities, preceded by succinct Rules relative to the Pronunciation, by Eleazer Williams, Missionary of the Protestant Episcopal Church at Green Bay, Michigan;" and contains a resolution that the Paper is worthy of publication in the next volume of the Transactions of the Historical and Literary Committee, is approved by the Society, and its publication ordered accordingly.

Dr. Hare read a communication, entitled "On the Change effected in the Nitrates of Potash and Soda, by the limited application of Heat, with a view to obtain pure Oxygen: and, also, on a Liquid and a Gaseous Ethereal Compound, resulting from the reaction of Nascent Hyponitrous Acid on Alcohol," &c. which was referred to a committee.

Mr. Nicklin read the dedication to the Society, of a Memoir on the Geology of North America, by Dr. Daubeny of Oxford, and accompanied the same by some remarks.

Mr. Nicklin stated that he should not have brought Dr. Daubeny's dedication before the Society, had it been one of mere form and flattery; but as it was a paper of research, showing much depth of observation, and justness of conclusion, and was written in a spirit evincing the best feeling towards his brethren on this side of the Atlantic, he thought it due both to the Society and the author, that it should be read at a stated meeting.

Mr. Du Ponceau made a verbal communication in regard to certain interesting works, now in course of publication in Europe,—in reference to the discovery, geography and history of America—and especially to that of M. Ternaux Compans. He also referred to the conclusions of Don Alonzo Zurita, in regard to the Mexican Picture Writing.

Mr. Du Ponceau remarked, that the American hemisphere, its discovery, geography, and history, seem to engage the attention of the learned in Europe, as much as they did in the sixteenth century. The great work of Baron Humboldt, entitled, "Examen Critique de l'Histoire de la Géographie du Nouveau Continent, et des Progrès de l'Astronomie Nautique aux 15e & 16e siècles," has now reached its fifth volume, and only comes down to the third and fourth voyages of Amerigo Vespucci. Another work, less learned, but not less important, is now in course of publication at Paris, by M. Ternaux Compans, of which fourteen volumes have already appeared. It is entitled, "Voyages, Relations et Mémoires Originaux pour Servir à l'Histoire de la Découverte de l'Amérique, publiés pour la première fois en Français." The *Journal des Savants* considers this collection as of the "highest interest." It contains many rare works, now out of print, written in different languages, and difficult, if not impossible, to be obtained;—several of which have not appeared in any other compilation.

Among these is a "Report on the Different Classes of Chiefs in New Spain," by Alonzo Zurita. This work, says the *Journal des Savants*, contains the best, the fullest, and the most interesting account of the system of government, and of the laws, usages, manners and customs of the Mexicans before the Conquest, and proves them to have been by no means so barbarous and uncivilized a people as they have been represented by their conquerors, who, by degrading them, thought to justify their own barbarity. Zurita was employed in Mexico by the Emperor Charles the Fifth, and resided there nineteen years, with the power of a magistrate and the curiosity of a philosopher. The work has not yet made its way into this country; but the Journal des Savants for the month of January last contains an ample and very interesting notice of it, and a full account of its contents. Speaking of the Mexican picture writing, this author, who was in Mexico not long after the Conquest, and had opportunities which are lost to the present generation, says: "that those characters had a *cursive* form, or running hand, and were capable of representing all the *sounds*, and all the proper names." This would show that the characters were connected with the *spoken* language, which is the doctrine advanced by Mr. Du Ponceau in his Dissertation on the Chinese System of Writing.

Mr. Du Ponceau expressed a hope that this interesting subject might be further investigated.

Mr. Vaughan informed the Society that Mr. Charles P. Fox, who possessed a large collection of the original letters and papers of Benjamin Franklin, had deposited them with the Society.

The Franklin papers were bequeathed, by will, to George Fox, father of C. P. Fox, by Temple Franklin, grandson to Benjamin Franklin, and by him submitted to Mr. Sparks, to aid him in the completion of his edition of Franklin's works. Mr. Sparks recommended Mr. Fox to deposit them with the Society, of which Franklin was so long President.

Dr. Hare made a communication respecting an extensive voltaic apparatus, of the form which he had designated by the name of galvanic deflagrator. This apparatus had been constructed for the Lowell Institute of Boston, under his direction, by request of Professor Silliman.

It consists of four troughs, each containing 100 pairs within a space of about 30 inches in length. The pairs, severally, are of the Cruickshank pattern, and about 6½ inches square, independently of the grooves, so as to expose about 42 inches of zinc surface. Every fifth plate is cemented into its groove by a compound of rosin and suet. The plates, intermediate between those thus cemented, are made to fit tightly into their grooves; but in consequence of a slight obliquity in their sides, can be extracted by the aid of forceps, so as to be cleansed, and, when expedient, scraped. The cementing of each fifth plate tends to prevent any injurious retrocession of the voltaic fluid; and yet when the intermediate four plates are removed, an interstice is vacated, sufficiently large to allow the stationary metallic surfaces to be reached by a scraper. The plates are all amalgamated, which not only renders them less susceptible of wasteful reaction with acid, but more susceptible of being cleaned. A strip of wood, 13 inches wide and 2 inches deep, is bored by a centre bit, so as to have eight vertical and cylindrical holes, which are all supplied with mercury. By means of ropes of copper wire, these holes are made to communicate severally with the poles of each of the troughs, so that every one of these has its corresponding mercurial receptacle. Arches of twisted copper wire are provided of such various lengths, that the receptacles may be connected in such manner as to cause the associated troughs to act either as one series of

400 pairs each of 42 inches of zinc surface; as a series of 200 pairs each of 84 inches of zinc surface; or as a series of 100 pairs each of 168 inches of zinc surface. In the usual mode of constructing the voltaic apparatus, the diversities of power that appertain to an apparatus in which the ratio of the size of the pairs to their number varies, as above described, can only be produced by changes in the arrangement, which are too inconvenient to be employed; but, according to the contrivance described, are attainable simply by shifting the connecting arches, so as to alter duly the mode in which the receptacles are connected with each other.

By means of this apparatus, the deflagration of metals, the arched flame between charcoal points, the fusion of platina by contact with the aqueous solution of chloride of calcium, the welding of iron wire to a rod of the same metal under water, were all accomplished with the most striking success.

In repeating Davy's experiment, in which the arched flame between charcoal points was subjected to the influence of a permanent magnet, the reaction between the voltaic and magnetic fluids was so violent, as to be productive of a noise like that of small bubbles of hydrogen inflamed in escaping from the generating liquid. This last mentioned experiment was performed by request of Prof. Henry, who manipulated in the performance of it.

Dr. Hare stated, that he had for many years endeavoured to draw the attention of men of science to the fact, that if, when a fine and a coarse wire of platina are made to form the electrodes or poles of a powerful voltaic series of not less than 300 pairs, the coarse wire, while forming the positive end or anode, be introduced into a concentrated solution of chloride of calcium, and the fine wire be made to touch the surface of the solution, fusion of the extremity into a globule will follow every contact. But when the polarity of the wires is reversed, the resulting ignition is comparatively feeble.

This experiment, Dr. Hare stated, was repeated to the satisfaction of Professors Silliman, Henry, and James Rogers, all of whom were present at the trial of the apparatus.

When the finer wire was plunged about an inch below the surface of the solution, it became luminous throughout, emitting rays of a brilliant purple hue.

For the fusion of the platina wire, in the experiment above described, it was found necessary to use the whole series consecutively as 400 pairs; showing, Dr. Hare remarked, that there are effects

which require a great number of pairs. He had, in previous experiments, found that fresh phosphuret of calcium was a conductor for 350 pairs of 7 × 3, but not for 100 pairs of $7\frac{1}{2}$ × 14.

The deflagration of an iron wire by contact with mercury, took place with phenomena which were never before witnessed by any of the spectators. At first the mercury was deflagrated with an intense silvery white light, after which there arose a vertical shower of red sparks, caused by the combustion of the iron. Lastly, a globule having accumulated at the end of the wire after a momentary stoppage of the reaction, an explosion took place, by which fragments of the globule, together with portions of the mercury, were projected to a great distance.

It would seem, said Dr. Hare, as if a globule of peroxide of iron, having formed at the end of the wire, caused a temporary arrestation of the voltaic current; but that the apparatus, gaining energy in consequence of a transient repose, was unable to break through the globule so as to disperse its particles with violence.

Mr. Walker made some remarks on the tornado, of limited extent, which visited Philadelphia on the 13th instant.

Mr. Walker's own observations, and those of several intelligent individuals, on different sides of the central path, led him to the conclusion, that the currents from without the borders of the tornado were directed, in every instance, towards its centre. This was manifest from the motion of the clouds, in the different strata of the atmosphere. The theory of the central tendency of the currents in tornadoes, usually ascribed to Mr. Espy, was, Mr. Walker remarked, of older date, having been advanced by Franklin in the middle of the last century. The whirl, on which so much stress is laid by Mr. Redfield and Colonel Reid, was distinctly seen in the lower current, where the condensed vapour, resembling spent steam, moved round in a spiral, making several turns downwards, each of smaller dimensions than the preceding, and resembling the motion of water in a common whirlpool. This circumstance seemed, to Mr. Walker, somewhat contradictory to part of Mr. Redfield's theory, that of the gradual enlargement of the periphery of the whirl, whereas the motion in the present instance was in a spiral tending inwards.

Mr. Lea confirmed, from his own observations, the central

tendency of the outer currents, and the spiral motion of the clouds in the lower stratum, near the centre of the tornado.

Dr. Hare made some remarks on the same atmospheric phenomenon, and especially on the bearing of the different facts upon his electrical theory of tornadoes.

Dr. Hare stated that he had not had his attention drawn to the meteor, until it had passed the zenith. But subsequently, seeing it distinctly from the top of his house, he had distinguished two clouds, one much above the other, between which there appeared to be an electrical reaction, tending to keep them at a distance, while the lower seemed to move from the south-west, and the upper one from the south-east. These features, together with the tremendous accompanying or preceding electrical discharges, as indicated by thunder and lightning, could not but demonstrate, in Dr. Hare's opinion, that electricity was the principal agent in the production of such phenomena. The fact mentioned in the public prints, that the iron chimney of a steamboat had been carried aloft, proved that a vertical force had been exerted; and the concentration of that force about a tall metallic cylinder was, Dr. Hare maintained, quite consistent with the idea, that the vertical force was the consequence of an electrical current, which would naturally concentrate the action about a prominent perfect conductor.

Dr. Hare could not reconcile the relative situation of the clouds, or their evident reaction and diversity of movement, with the theory of Mr. Espy.

The following gentlemen were duly elected members of the Society:—

Robert Were Fox, of Falmouth, England.

John Sanderson, of Philadelphia.

Francisco Martinez de la Rosa, of Madrid.

Major James D. Graham, U. S. Topographical Engineers.

J. B. B. Eyries, of Paris.